Changes of Hydrological Regime of the Danube Delta

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Many years' changes of climatic characteristics in the Danube Basin result at respective changes in the river hydrology. The Danube Delta is a sink for hydrographical network of the river basin. So, directional changes of water and thermal flow entering the delta and further on the Black Sea are the integral indications of changes in such most important climatic parameters as precipitation and air temperature. Set of average annual flows of the Danube for the last 30 years shows a well-pronounced positive trend - about 60 m3/s per year. At that, average annual Danube flow in the second half of the period (1996 - 2010) showed almost 1000 m3/s excision of the similar characteristics for 1981 - 1995. Growth of the Danube flow in late 20th - early 21st Century, as well as extreme floods happening during that period, evidence the apparent increase in the main input of the Danube Basin water balance - amount of precipitation. Increase of the Black Sea level is the well-known fact. At that, big role in the water balance of the sea is played by the Danube, which brings about 60% of total river input. Long-term positive trends are observed both on Ukrainian and Romanian coast. For the period 1981 - 2010 intensity of water level rising makes here 3 - 5 mm/year. Backing caused by the Black Sea level growth extends in the Danube Delta up to the distance 50 km from the sea-side. Changes connected with global worming took place in thermal regime of the Danube Delta for the last 30 years: water temperature increased and thermal flow to the Black Sea grew. At that, about 50% of annual thermal flow amount falls at the period from May to July. Increase of air temperature in the Danube Delta has also resulted at noticeable decrease in duration of ice phenomena periods.

Current State of Overfishing in the Black Sea

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Long-term (1950–2006) changes of fish landings in combination with some ecosystem indicators are used to evaluate the status of Black Sea fishery and to draw inferences on its sustainability. Dramatic changes started even before the 1950s when the industrial fishery in Soviet Union depleted large pelagic predator and demersal fish stocks. The conditions were exacerbated when the Turkish fishery consumed their remaing stocks during 1955-1975. The fishery then targeted principally on small pelagics over the entire sea. Following highly efficient energy transfer to higher trophic levels during intense - eutrophication but overfished state of the 1980s, the total catch within the Black Sea declined abruptly from ~750 ktons (ktons = 103 tons) to ~200 ktons at 1989-1991. Thereafter, total landing in

all the Black Sea countries except Turkey remained at most 10% level of the previous phase. Following the glory times in the 1980s, the present Black Sea conditions then possess a totally collapsed ecosystem in the western and northern regions (roughly 63% of the total Black Sea area) in response to the combination of overfishing and ecological degradation.The Turkish catch within the southern basin, on the other hand, recovered immediately, but only for anchovy, at a mean catch size of 368±74 ktons (for 1992-2006) with respect to the maximum sustainable catch estimate of about 175 ktons. The Turkish EEZ still manages handling the commercially low cost anchovy fishing but it appears to be unstable experiencing large multi-annual fluctuations. Its average level during the last 20 years roughly amounts to twice of the maximum sustainable catch of about 175 ktons. Reducing exploitation rate of the Turkish fishery by half to its level of the early 1990s is a first step to secure a healthy and sustainable Turkish anchovy fishery. In the regional context, the present analysis identifies an immediate requirement for the implementation of a common and co-ordinated basin-scale ecosystem approach to fishery management in coordination by all the Black Sea countries in spite of its socio-economic costs.

On an acidification of the Black Sea waters in XX century

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The goal of presentation is to assess the rate of acidification (if it does exist) of the Black sea waters in XX century using historical data set since 1924. In spite of high level of the noise and intense interannual variability of pH, the acidification has been really observing between 1980 and 2000. The rate of acidification for the last decade of XX century exceed 0.2 pH units per decade in the upper sea layers. Note at the same time that such high level of the acidification of the Black Sea upper layers is only in part due not to the rise of carbon dioxide concentration in the atmosphere. The main reason of pH decreasing in the upper Black sea layers is the intensification of the upward motion in the subsurface layers because of increasing of cyclonic $\mathrm{circ}_z\tau$ (*Polonsky and Shokurova, 2009*). In fact, this leads to the delayed pH decreasing in the upper layers because pH is decreasing to the depth (Figure 1).

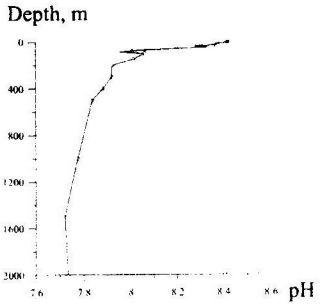

Figure 1. Vertical profile of the average Black sea pH